

Docket #71219

STEERING TRIANGLE

CROSS REFERENCE TO RELATED APPLICATION

[0001] This is a continuation of and claims the benefit (35 U.S.C. §120 and 365(c)) of copending International Application PCT/DE 03/00418 of February 12, 2003, which designated inter alia the United States and which claims the priority of German Application DE 102 19 5 708.3 of May 2, 2002. The entire contents of each application is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention pertains to a steering triangle for the axle suspension of motor vehicles for the articulated connection of a vehicle axle with the vehicle chassis with two 10 control arms, which are connected to each other in a joint housing formed together by the said control arms.

BACKGROUND OF THE INVENTION

[0003] Such steering triangles, which have been known from the state of the art, are used especially in utility vehicles. Thus, for example, a control arm for a motor vehicle wheel suspension has been known, which comprises a two-part arm body, wherein the two arm bodies form at one of their ends a common mount for a rubber-metal bearing, by means of which the control arm can be fixed at a wheel carrier or an axle. The opposite free ends are used for the body-side fixation of the steering triangle.

[0004] Such control arms are usually designed as forged or cast parts, and, when viewed in the top view, a relatively large area is required especially in the case of cast parts within the framework of the preparation of the casting molds, even though the mass of the two control arms proper is relatively small. The division of the steering triangle into two control arms, which may optionally have identical shape, offers a considerable cost advantage in this respect, which can also be felt favorably in the case in which the steering triangle is designed as a forged part, because a considerable reduction of the operations involved in the manufacture can be brought about due to the division into two parts.

[0005] However, the drawback of such control arms is that the rubber-metal bearing arranged within the central joint housing formed by the two control arms together provides for the pretension of the elastomer body responsible for the elastic mounting in the radial direction only due to its design. Since elastomer bodies can absorb, in general, only extremely low tensile stresses, the bearing described within the framework of the invention is hardly suitable for

absorbing axial loads.

SUMMARY OF THE INVENTION

[0006] The object of the present invention is therefore to further improve a steering triangle of the type corresponding to this type such that the stresses occurring especially in utility vehicles can be absorbed to an increased extent by the central bearing of the steering triangle for the axle connected thereto.

[0007] This object is accomplished according to the present invention in that two pressing rings, which can be moved toward each other by a tensioning device via the intermediary of stop faces of the joint housing, which stop faces are in contact with the outer sides of the pressing rings, which said outer sides face away from each other, are arranged within the recess of the joint housing on the axial outer sides of the elastomer body. Due to this design according to the present invention, especially the elastomer body, which extends especially around the spherical surface of the pivot axis or pivot part, can be pretensioned not only in the radial direction, but also in the axial direction. This pretension is decisive for the rigidity of the elastomer body in the axial direction, the value of the rigidity being proportional to the capacity for absorbing axial forces that occur.

[0008] Another advantage of the present invention can be seen in the fact that due to the possibility of axial pretensioning, the rubber-metal bearing can be set for different requirements, whereas the rubber blend used for the elastomer body may have to be modified for different

rigidities in conventional constructions known from the state of the art.

[0009] The pressing rings are preferably rigidly connected to the elastomer body, and this rigid connection may be embodied, e.g., by vulcanization/molding-on. The pretensioning in the axial direction is performed via the pressing rings.

5 [0010] Provisions are made according to an expedient variant for the tensioning device to have a plurality of tensioning screw connections, which are arranged in parallel to the pivot axis and are accommodated in through holes of the joint housing. The tensioning screw connections represent an inexpensive possibility of a simple design for pretensioning the pressing rings by screwing together the control arms in the area of the joint housing formed jointly with the
10 necessary forces.

[0011] Sufficient tensioning forces are provided here, e.g., by three or more tensioning screw connections arranged coaxially around the central recess for the rubber-metal bearing.

15 [0012] To reduce the shearing forces appearing in the area of the central joint housing connection especially in the case of very great torsions of the two control arms in relation to one another and not to overload the tensioning screw connections located there, it proved, moreover, to be advantageous to provide at least one of the tensioning screw connections with a shearing sleeve, which is arranged within the through hole associated with the said tensioning screw connection and extends around the tensioning screw.

[0013] However, it is also possible to provide all tensioning screw connections with shearing sleeves which are arranged within the through holes and extend around the tensioning screws.

[0014] The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference is made to the accompanying drawings and descriptive matter in which a preferred embodiment of the invention is illustrated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Figure 1 is a top view of a steering triangle according to an embodiment of the present invention; and

[0016] Figure 2 is a sectional view of detail B from Figure 1 in the area of the joint housing formed by the two control arms together.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] Referring to the drawings in particular, the steering triangle is designated in its entirety by 1 and is shown in Figure 1. The steering triangle 1 has two control arms 2 and 3,

which are mirror-symmetrical to each other. The control arm 2 has an end area 5 bent at an angle. The control arm 3 has an end area 4 bent at an angle. The two end areas 4 and 5 together form the joint housing 6. Due to the end areas 4 and 5 being bent at angles and the contact surfaces of the control arms 2 and 3 located in this area, the entire steering triangle 1 has an essentially V-shaped form when viewed in the horizontal projection. The steering triangle 1 has two end areas 7 and 8, which are used for fastening the steering triangle 1 to body-side mounts, which are not specifically shown here. The steering triangle 1 is fastened in an articulated manner by means of rubber-metal bearings 9 and 10. A rubber-metal bearing 11 establishes an articulated connection with a utility vehicle axle, which is fastened to the rubber-metal bearing.

10 The utility vehicle axle is not specifically shown here. The rubber-metal bearing 11 is likewise accommodated in the joint housing 6 formed by the two control arms 2 and 3.

[0018] The special embodiment of the joint housing 6 with the rubber-metal bearing 11 located therein is shown in greater detail in Figure 2. The rubber-metal bearing 11 contains a pivot part or pivot axis 12 with a spherical segment 13 arranged symmetrically with the ends of 15 the pivot axis. The spherical segment 13 is surrounded by a one-part or multipart elastomer body 14, which is arranged via the intermediary of a sleeve 15 in a recess 16 of the joint housing 6 formed by the end areas of the control arms 2 and 3. Two pressing rings 17 and 18 are molded 20 on the axial outer sides of the elastomer body 14 by vulcanization. The pressing rings 17 and 18 have a flange area 20 arranged essentially in parallel to the central longitudinal axis 19 of the pivot axis 12 as well as a flange area 21 projecting outwardly at right angles thereto. On the outer side of the flange area 21 facing away in the elastomer body 14, a stop face 22 of the joint

housing 6 is in contact with the flange area.

[0019] As is additionally apparent from Figure 2, the two control arms 2 and 3 of the steering triangle 1 are connected to each other via a tensioning device comprising a plurality of tensioning screw connections 23. At least one tensioning screw connection comprises a
5 tensioning screw with a nut screwed on it as well as a shearing sleeve 24 surrounding the tensioning screw. The at least one tensioning screw connection 23 is arranged within a through hole 25 of the joint housing 6 with the shearing sleeve 24 extending around the tensioning screw. The screwing together of the tensioning screw connections 23 causes the rubber-metal bearing 9 inserted loosely into the recess 16 to be fixed both in the radial direction by the sleeve 15 and in
10 the axial direction by the pressing rings 17 and 18, and forces of pressure are applied at the same time on the elastomer body 14. As a result of this a pretensioning of the component is brought about and, as a result of this, the rigidity of the elastomer body 14 is increased, so that forces of pressure applied by a movement of the pivot axis 12 on the elastomer body 14 can be absorbed without problems after the end of the installation.

15 [0020] It should be observed in this connection that the elastomer body 14 is fixed at the pivot axis 12 and at the pressing rings 17, 18 by means of a vulcanization process. The connection between the elastomer body 14 and the sleeve 15 is due only to corresponding frictional forces.

[0021] While a specific embodiment of the invention has been shown and described in

detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.